

## **Memory Control Apparatus and Efficient Search Pattern for Block-Matching Motion Estimation**

### **ABSTRACT OF THE DISCLOSURE**

A memory control apparatus for block-matching motion estimation and an associated search pattern for processing video sequence in real-time are described in this disclosure. The motion estimation subsystem utilizes a set of memory banks to store a section of the reference picture used for computing the differences between an underlying block and a spatially shifted reference block. The memory control apparatus derives the memory addresses for storing the reference picture region in the memory banks in such a way that a row or a column of data from the reference block can be accessed in parallel without wait. The row- or column-data are then made available to the parallel computation unit for computing the block difference in a single processing cycle. An associated spiral search pattern that covers the whole search region is also described that minimizes the required data access and consequently saves power consumption. Combined with a search-stop criterion, the search pattern will result in early search termination during the block-matching motion estimation process and consequently conserves more power.

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